EDITORIAL

Trauma to the spleen

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After blunt abdominal trauma the diagnosis of splenic injury is usually made on clinical grounds, with the addition of peritoneal lavage where doublt exists about intraperitoneal injury or severe head or spinal trauma complicates the picture, (Powell & Bivins, 1982). Decisions about management are often taken on clinical grounds alone with confirmation of the diagnosis being obtained at operation or by later use of radiological imaging. (Mishalang & Miller, 1982).

There seems little doubt that the accuracy of diagnosis in the acutely injured patient could be improved in many areas by the provision of trauma centres containing computerized tomographic facilities on a 24–h basis (Alexander & Clark, 1982). Doctors seem to have caught the political disease of concerning themselves more about cost than quality in failing to lobby for this type of development.

Faced with the problem of suspected splenic injury, surgeons are currently managing patients who a mere 10 years ago would have been subject to splenectomy by a variety of techniques which aim to conserve splenic tissue and splenic function.

Awareness of the dangers following splenectomy in children led many children's surgeons to respond by treating these injuries more conservatively with great success. Reports which indicated similar dangers to the asplenic adult then led to further interest in splenic conservation, with the emphasis on operative repair of the organ or autotransplantation of free grafts rather than non-surgical treatment.

Splenic conservation in children is undoubtedly safe and has been practised in many centres for several decades. Splenic isotope scanning, or computed tomography, confirms the injury and its resolution with both methods, giving accurate diagnosis in over 95% of individuals. Should the spleen require removal for continued bleeding then the practical alternatives of partial splenectomy or autotransplantation are used. The spleen does not regenerate after resection, and to offer complete protection against infection with organisms such as pneumococcus or Haemophilus influenzae would need to retain at least half its original bulk vascularized directly by the splenic artery (Horton *et al.*, 1982).

Autotransplanted tissue may have the ability to produce normal immunoglobulin

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levels, sustain serum levels of Tuftsin, remove Howell Jolley bodies and keep platelet count normal, but there is currently no evidence to suggest it can do the one thing we would all desire—prevent death from bacterial sepsis, as lymphoid regeneration in the fragments is very poor.

The value of splenic tissue fragments in this situation is difficult to define in practice, but the evidence from long-term cardiovascular observation supposes a protective benefit against ischaemic heart disease.

In children delayed rupture is almost unknown and other abdominal injuries that require surgical treatment are quite rare. Conservation of the injured organ affected by disease such as infectious mononucleosis has also been undertaken successfully, but one would need to be much more cautious in recommending this as a general approach. Most authors agree that nearly 90% of all children who damage their spleen can be treated without laparotomy (Cooper & Williamson, 1984).

Between 15% and 50% of adults who suffer blunt injury to the abdomen have additional organ injuries which may or may not require surgical treatment, and therefore a blanket non–operative approach is less sound (Solheim & Høivik, 1985). In one study non–operative treatment actually prolonged hospital stay, and in another paper 70% of patients treated by this method initially, eventually needed operative repair or removal of their ruptured spleen (Mahon & Sutton, 1985, Malangoni *et al.,* 1985). The emphasis in adult patients has therefore been on operation and repair of the spleen. Ligation of feeding vessels; partial splenectomy; and simple buttress suturing with topical haemostatic agents such as micro crystalline collagen, collagen fleece and tissue adhesives seem to be equally effective with a low risk of re-bleeding (Scheele *et al.,* 1984).

The risks of re-bleeding following repair remain at about 2–3% (Moore & Moore *et al.,* 1984), which is probably about the same risk of overwhelming sepsis occurring late after splenectomy (Singer, 1973). The decision on repair, therefore, is finely balanced, and where there is less than perfect control of haemmorhage, the operating surgeon should not fear criticism for performing total splenectomy. Autotransplantation of splenic tissue should be using the omental pouch technique with slices 3mm thick to a total of 20/50g.

Attempts have recently been made to identify features of the splenic injury radiologi- cally which might predict the outcome of operation or expectant treatment, and as might be expected the success of conservation depends entirely on the extent of injury with incomplete or complete tears (type I and II) doing well and separation of fragments (type III and IV) doing badly on non–operative treatment (Buntain *et al.,* 1988, Resciniti *et al.,* 1988).

The decision on when to perform surgical treatment in children is relatively straightforward. The blood volume of a child is approximately 85ml/kg and should the patient have received 40ml/kg in volume transfusion and remain unstable, then surgery will be required. Laparotomy should be undertaken at this point, with appropriate surgical treatment. This may be total splenectomy, partial splenectomy or suturing; all have been shown to be effective in controlling haemmorhage (Büyükünal *et al.,* 1987). Only preservation of half or more of the spleen, subsequently confirmed on Technetium scanning, should be taken as an indication that prophylactic antibiotic therapic is not required.

POST-SPLENECTOMY SEPSIS

Although the most common organism to cause overwhelming sepsis following splenectomy is *Streptococcus pneumoniae* (50%), there are other encapsulated organisms such as *Haemophilus influenzae* and meningococci which are known to cause life–threatening infection. Coliform infection, tuberculosis and staphylococcal infections are also known to be enhanced by splenectomy as are viral infections and malaria. Protozoal infection with babesiosis has also been fatal in splenectomized patients.

By far the most common problem is that of the pneumococcus and the current vaccine has been improved from the 14 valent vaccine to a 23 valent vaccine. The 23 valent vaccine covers most of the pneumococci normally encountered in man, but there are more than 80 capsular sub-types already identified, the less common serotypes remain a theoretical risk (Fedson, 1988).

The current recommendations for adults undergoing vaccination is that re–vaccination is probably unnecessary under 10 years, and severe local reactions have followed earlier re–vaccination. (It would therefore be wise to check the patient's immunological status towards streptococci before re–vaccinating in this age group.)

In children the antibody levels fall to the pre-vaccination levels within 3–5 years, therefore the very young will require investigation at these intervals before re–vaccination is offered.

Is vaccination alone sufficient or should it be combined with Penicillin prophylaxis? The question was partially answered by work done in Trinidad by the Medical Research Council. Penicillin prophylaxis alone in sickle cell disease patients caused a rebound series of infections when the drug was stopped. This did not occur when the patient had been vaccinated before the Penicillin therapy ceased. Further work in very young children with sickle cell disease found that mortality and morbidity was reduced when both modalities of treatment were used (Gaston *et al.*, 1986).

Until quite recently it was thought that the pneumococcus would not develop resistance to Penicillin therapy, but this has now been shown to be a false hope. Increasing numbers of resistant organisms are being reported, and the value of vaccination is therefore increasing in asplenic individuals.

Penicillin has to be given twice daily without fail to be effective, and vaccination to encapsulated organisms should be seen as the mainstay of therapy in all patients in whom splenectomy, autotransplantation or more than hemi-splenectomy has been performed.

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